Progress in the Development of the MISTE Flight Experiment

M. Barmatz, Inseob Hahn and Fang Zhong

Jet Propulsion Laboratory, California Institute of Technology
Pasadena, CA 91109

Abstract

Progress in developing the MISTE flight experiment that plans to measure the specific heat at constant volume, C_V, and isothermal susceptibility, χ_T, in a microgravity environment will be presented. Pressure-density measurements along isotherms below the critical temperature have been performed to determine the isothermal susceptibility along the coexistence curve. These measurements will be compared to susceptibility data obtained along the critical isochore above the transition. A sweep electrostriction method was also demonstrated for obtaining the isothermal susceptibility close to the critical point. We have been able to demonstrate that the chemical potential can be obtained from these electrostriction measurements. Precision ground-based experiments are now being performed in the crossover region away from the critical point. These measurements were analyzed using recently developed theoretical crossover models. The results of these theoretical analyses and their relevance to the MISTE microgravity experiment will also be presented.